

# 10-5 What is a Series circuit?

**Objectives** ► Explain how electricity flows through a closed circuit. ► Describe a series electric circuit.

## TechTerms

- **electric circuit:** path that an electric current follows
- **series circuit:** circuit in which electric current follows only one path

**Circuits** An **electric circuit** is the path that an electric current follows. When wires are connected to a battery and to a lamp, the lamp will light. The wires, lamp, and battery form an electric circuit. If the wires are disconnected, current cannot flow through the circuit.

All electric circuits have three parts. A circuit needs a source of electric current. This can be a battery or a wall outlet. The load is the device that uses the electric current. The load can be a light bulb, a motor, or some other electric device. Wires connect the battery to the load. Most electric circuits also have a switch.

► **Describe:** What are the parts of an electric circuit?

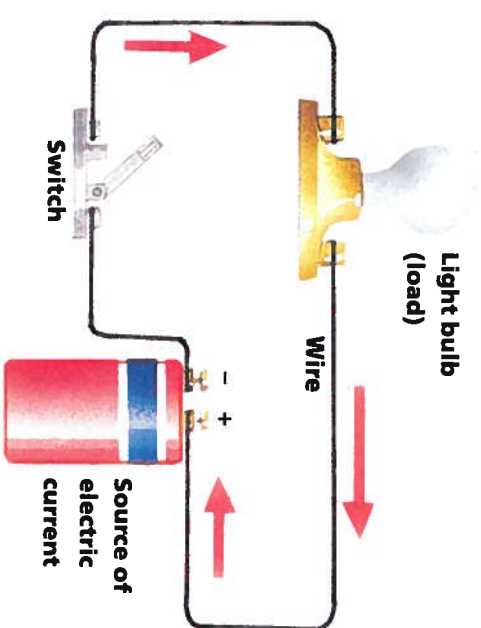


Figure 1

**Open and Closed Circuits** Electric current cannot flow through an open circuit. Electric current can flow only through a closed circuit. A switch is used to open and close an electric circuit. When a switch is off, the circuit is called an open circuit. When the switch is on, the circuit is called a closed circuit.

► **Explain:** Why is a switch used in an electric circuit?

**Series Circuit** The simplest type of electric circuit is a **series circuit**. In a series circuit, the current follows only one path. Figure 1 shows a series circuit. The path of the current is from the negative electrode of the battery, to the lamp, to the positive electrode of the battery. Figure 2 also shows a series circuit. In this circuit, the battery is connected to two lamps. The current first goes to one lamp, and then to the other lamp.

► **Define:** What is a series circuit?

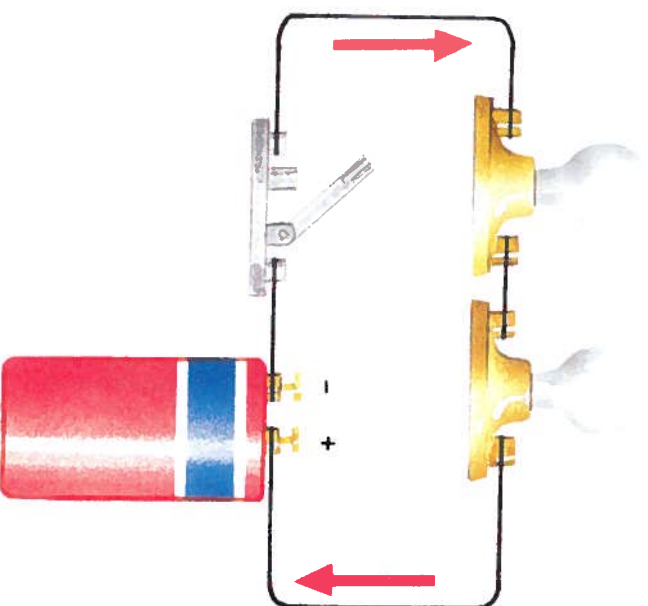


Figure 2

## LESSON SUMMARY

- An electric circuit is the path an electric current follows.
- All electric circuits have four parts: a source of electric current, a load, wires, and a switch.
- Current flows only through a closed circuit.
- In a series circuit, the current follows only one path.

**CHECK** Complete the following.

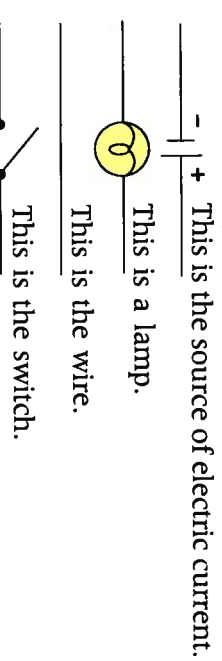
1. A lamp that has been switched on is an example of a \_\_\_\_\_ circuit.
2. A battery connected to one lamp is an example of a \_\_\_\_\_ circuit.
3. A circuit needs a source of current, a load, and \_\_\_\_\_.
4. Current flows through one path in a \_\_\_\_\_ circuit.
5. Current cannot flow in a(n) \_\_\_\_\_ circuit.

**APPLY** Complete the following.

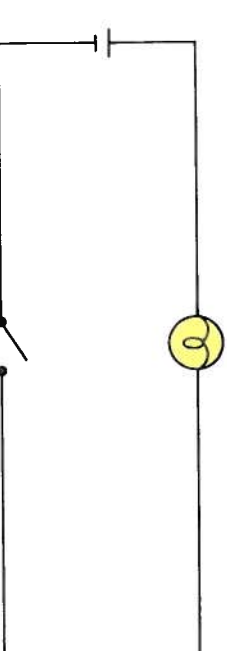
6. Why does an electric circuit need a switch?
7. **Model:** Think of an electric circuit as water flowing through pipes. What represents the electric current in this model?

## Skill Builder

**Diagraming** You know that all electric circuits have four parts. You can use this information to draw a circuit diagram. In order for someone else to understand your diagram, it is helpful to use standard symbols for each part of the circuit. Here is a list of some of the most common circuit diagram symbols.



The diagram shows an open series circuit with one lamp connected to the current source.



Use this information to draw a circuit diagram for a closed series circuit with two lamps.

## LOOKING BACK IN SCIENCE

### COMPUTERS

In 1946, two American scientists built the first electronic computer. Early computers were very large. They had a limited amount of memory, or ability to store information. Over the years, computers have become much smaller and more powerful.

One invention that helped make computers better was the integrated circuit, or chip. The first chip contained two transistors. Soon scientists found ways of squeezing more transistors into a chip. Chips became smaller and electronic circuits became more complex. Today's chips contain thousands of transistors. These chips allow very small but complex electronic circuits to be made inexpensively.

Many everyday devices, such as microwave ovens, cars, watches, and cameras contain tiny computers that control parts of the machine. Computers are also used to help design and invent new machines. Computers are still being made smaller and faster. In the future, researchers may design computers that can "think" like humans.

